REMARKS

Applicants are amending the specification to correct a typographical error. The claims are amended to better define the invention. The claims subject to the restriction requirement are being canceled without prejudice as to filing a divisional application. In regard to the information disclosure statement, applicants respectfully submit that they did comply with the requirements because when this application was filed, September 10, 2003, U.S. 6,761,513 was still pending. The '513 patent issued July 13, 2004 and that number had not been assigned in September 2003. Applicants therefore respectfully request the examiner to consider the cited reference.

Applicants respectfully traverse the rejection of the claims over the cited art and respectfully request reconsideration. For convenience, applicants may from time to time use reference numerals that refer to the drawings of this application, but the use of the reference numerals is merely for convenience and not in a limiting manner. Claim 1 as amended requires an annular feed piston 33 connected to the inner housing 21 and located in an annular feed chamber 51 (Fig. 2) between the inner and outer housings 21, 13. The claim requires a feed passage 95 for supplying air pressure to the feed chamber. In Shemeta, the feed advance is hydraulic not pneumatic, as explained on page 5, paragraph 41, and shown in Figure 4. Telescoping pistons 805 and 807 are mounted in a feed cylinder 801, which is connected to the rearward end of outer housing 105 and supplied with hydraulic fluid pressure to advance and retract air motor 107. Air is supplied through the bores 804, 806 of pistons 805, 807 to air motor 107. It appears that only piston 807 moves and piston 805 is stationary with feed cylinder housing 803.

Referring to the schematic of Figure 8 of Shemeta, hydraulic pump 300 supplies hydraulic fluid pressure to feed cylinder 801 to advance and retract pneumatic motor 107. As

hydraulic fluid is supplied to the rearward side of piston 807 (not numbered in Figure 8), the hydraulic fluid on the forward side flows through a feed control restrictor 813 and back to the reservoir for pump 300. Air pressure is supplied to trigger valve 903 for driving air motor 107, but not for feeding motor 107 inward.

Applicants' device utilizes air pressure not only for operating pneumatic motor 25, but also for causing inner housing to move forward. Claim 1 requires this feature, and it is not shown in Shemeta. Even if Shemeta changed the hydraulic fluid to air pressure, claim 1 also requires the feed piston to be within an annular feed chamber between the inner and outer housings. In Shemeta, neither of the feed pistons 805, 807 are within a chamber between any inner housing and the outer housing. They are located in a feed cylinder 801 mounted to the rear of outer housing 105.

Claim 2 depends from claim 1, requiring a sealed annular fluid restrictor chamber 39, 41 (Figure 2) located between the inner and outer housings and containing a hydraulic fluid for controlling a rate of movement of the inner housing. The claim requires that the restrictor chamber have an orifice 49 (Figure 2) through which the hydraulic fluid flows while the feed piston 33 is advancing the inner housing toward the extended position. In Shemeta, restrictor orifice 813 controls the flow of hydraulic fluid from the return side of feed cylinder 801. However, Shemeta the return portion of feed cylinder 801 is not sealed, rather it leads to the reservoir that feeds pump 300. Feed cylinder 801 is not located between inner and outer housings, as required by claim 2.

Claim 3 deals with more features of the restrictor chamber, requiring an annular forward piston 29 (Figs.1 and 2) mounted to inner housing 21 for axial movement therewith, a stationary seal 37 fixed to outer housing 13 and defining an annular forward restriction chamber 39 that

contains hydraulic fluid. The claim requires that the feed piston 33, also referred to as an intermediate piston, be located rearward of the stationary seal 37, defining a rearward restrictor chamber 41 that contains hydraulic fluid. Claim 3 thus requires two pistons that move with inner housing 21, which are the forward piston 29 and feed piston 33. Shemeta shows only one movable piston, which is outer feed piston 807 (Figure 4). Inner piston 805 is stationary, but not located between an inner housing containing air motor 107 and outer housing 105.

Claim 3 also requires a bypass passage 43 extending between the chambers and an adjustable orifice 49 to vary the flow rate between the two chambers. Shemeta does not have forward and rearward chambers separated by a stationary seal. The return portion of feed cylinder 801 is separated from the feed portion of feed cylinder 801 by movable piston 807 (Fig. 4) and does not have forward and rearward portions separated by a stationary seal. Orifice 813 separates the return portion of feed cylinder 801 from the reservoir, not from a portion of a restrictor chamber.

Claim 5 requires an annular retract piston 35 (Fig. 1) that moves the inner housing in response to air pressure. There is no separate retract piston in Shemeta, rather piston 807 (Fig. 4), which both feeds and retracts air motor 107.

Claim 6 requires a sensor assembly that provides a signal when the housing begins to move from the retracted position and also a signal when the inner housing reaches the extended position. In addition it requires a processor for determining an amount of time between these signals. Shemeta does not disclose any type of processor for determining an amount of time between signals. Eckman does not utilize air pressure to advance, rather utilizes a gear train that rotates gears on a rod 1 to cause it to advance. Applicants could not find any mention in Eckman

of a processor for determining a time interval and comparing that time interval to a reference in a database.

Claim 7 similarly requires a processor that not only determines the elapsed time between signals but also compares the elapsed time to a predetermined reference and provides an indication when the elapsed time exceeds the reference. This information allows the operator to make a decision on when to change the drill bit. Applicants could not find any discussion of this feature in Eckman.

Claim 8 requires at least one dome member 147 (Figure 7) located within a cavity in a pneumatic passage 119 extending to the cavity 145 for delivering air pressure to the cavity upon initial movement of the housing from the retracted position. The air pressure causes the dome member to deflect in engagement with contact 153. The examiner cited Frederick for the purpose of a dome member. Frederick shows a dome member in Figure 6 however it does not show an air pressure passage that leads to it to cause the dome member to deflect in response to an air pulse. Rather it is deflected into an electrical contact when an object 144 is placed on it. It uses the weight of the object to make up the electrical connection. The combination thus does not meet the requirements of claim 8.

Claim 9, is similar to claim 8 and requires a dome member and an air passage leading to it. It differs from claim 8 in that it requires a feed dome member and a retract dome member, and neither are shown by the references, singly or combined.

Claim 11 has many of the requirements previously discussed. For example, it requires an annular feed piston extending around the inner housing for movement therewith and sealingly engaging the bore of the outer housing and a feed air inlet for applying air pressure to the feed piston. Even if one supplied air pressure to outer feed piston 807 in Shemeta, rather than

hydraulic fluid pressure, outer feed piston 807 does not sealing engage a bore of outer housing 105. Rather outer feed piston 807 sealingly engages the bore of feed cylinder 801, which is attached to the rearward end of outer housing 105.

Claim 11 requires annular forward and rearward restrictor chambers that contain hydraulic fluid. Shemeta controls the feed rate through a hydraulic fluid restrictor on the return side of feed piston 807, but does not teach the use of air pressure for causing the feed piston to move forward. Air pressure has an advantage over hydraulic fluid pressure in that it is more compliant because it is compressible, while hydraulic fluid is substantially incompressible. If one used air pressure in feed cylinder 801 of Shemeta, rather than hydraulic, there still would be no forward and rearward restrictor chambers between inner and outer housing. Shemeta shows only feed and retract chambers. Claim 13 requires in addition to the feed piston, an annular retract piston, while Shemeta shows only a single piston that both advances and retracts.

Claim 14 requires that the air pressure supplied to the feed air inlet for the feed piston be independent of air pressure supplied to the pneumatic motor assembly. In Shemeta, the air pressure supplied to the motor is independent of the pressure supplied to the feed mechanism, but the pressure supplied to the feed mechanism is hydraulic, not pneumatic. Claim 15 requires an annular feed piston and an annular retract piston, the feed and retract pistons being located in separate chambers. This does not exist in Shemeta.

Claims 17 and 18 deal with specific features of the pneumatic feed assembly, none of which are shown in Shemeta. For example, claim 17 requires a shuttle valve 93 that supplies air pressure to the feed chamber and has a closed position that bleeds air pressure from the feed chamber. Claim 18 deals with a shuttle valve having a feed position for supplying air pressure to the feed chamber. It requires a normally closed feed valve 87 that when open supplies a pilot

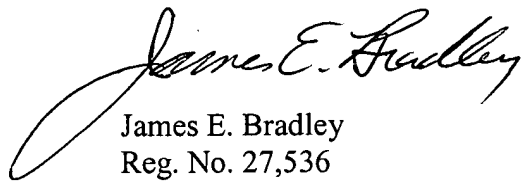
pressure close to the shuttle valve 93 to move it to the feed position. The reference does not show this feature. The claim requires a retract valve 55 that delivers a pilot pulse to initiate movement of the shuttle valve 93. It requires a striker member 63 mounted to the inner housing for contact with the retract valve when the inner housing reaches the end of the feed stroke. This arrangement is not shown. Claim 19 requires an emergency valve 101 incorporated with the valve assembly that when manually depressed bleeds air pressure from feed chamber 51 to stop feed movement. The air pressure contained within the retract chamber 53 thereby moving the inner housing to the retracted position. The references do not show a pneumatic feed and retract system, this feature is not shown.

Claim 20 requires an annular forward piston 29 mounted to inner housing 21, a stationary forward seal 37 fixed to outer housing 13, an annular forward restrictor chamber 39 containing hydraulic fluid, and an annular feed piston 33 mounted to inner housing 21 defining a rearward restrictor chamber 41 that contains hydraulic fluid. The claim further requires a pneumatic chamber 53 on the rearward side of feed piston 33 for moving the housing forward, a bypass passage 43 and an adjustable orifice 45. As discussed above, Shemeta does not show a forward piston located forward of a stationary seal and a feed piston located rearward of the stationary seal. The chambers in Shemeta comprise the hydraulic advance and hydraulic retract chambers and do not operate in conjunction with a pneumatic chamber for controlling the feed rate.

Claim 21 among other features requires a start feed dome member and a start feed pneumatic passage extending to the feed cavity contained in the dome member for deflecting the dome member in response to a feed pulse of air. Figure 7 illustrates the retract dome member and shows how an air pulse in passage 119 will deflect dome member 147 into contact with contact 119. The references do not show deflecting a dome member in response to air pressure.

It is respectfully submitted that the claims are now in condition for allowance and favorable action is respectfully requested.

Respectfully submitted,



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